

Amendments to the Claims:

This listing of the claims will replace all prior versions, and listings, of the claims in the application:

1. (Cancelled)

2. (Currently Amended) AThe radiator element comprising: of Claim 4

a first pair of notch radiator elements spaced apart from one another and
disposed in a first plane, each of said notch radiator elements having a feed surface;

a second pair of notch radiator elements spaced apart from one another and
disposed in a second plane which is substantially orthogonal to the first plane in which
the first pair of notch radiator elements is disposed, such that the first pair of notch
radiator elements are disposed to receive RF signals having a first polarization and the
second pair of notch radiator elements are disposed to receive RF signals having a
second polarization which is orthogonal to the first polarization, said first and second
pairs of notch radiator elements being symmetrically disposed about a centerline
defined by an intersection of the first and second planes and each of said notch radiator
elements; and

a balanced symmetrical feed including:

a first pair of radio frequency (RF) feed lines, each of the RF feed lines
disposed symmetrically about the centerline and each of the RF feed lines
coupled to a feed surface the first pair of notch radiator elements; and

a second pair of RF feed lines, each of the RF feed lines disposed
symmetrically about the centerline and each of the RF feed lines coupled to a
feed surface of the second pair of notch radiator elements wherein with the first
and second pairs of RF feed lines are coupled to the first and second pairs of
notch radiator elements such that the first and second pairs of notch radiator

22 elements are provided having coincident phase centers adjacent the transition
23 sections wherein the balanced symmetrical feed is provided as a raised balanced
24 symmetrical feed and further comprises:

25 a housing having four sidewalls with each sidewall having an upper
26 edge surface and a lower edge surface, the housing having a central
27 longitudinal axis which is aligned with the centerline defined by the
28 intersection of the first and second planes; and

29 a raised structure projecting from the upper edge surface of said
30 sidewalls, said raised structure having a substantially pyramidal shape
31 with each of the feed lines in the first and second pairs of feed lines
32 disposed on one of the four sidewalls and on one of the four sides of the
33 pyramidal-shaped structure wherein each of the feed lines have an end
34 which terminates at a point on the pyramidal-shaped structure which is
35 substantially aligned with the centerline defined by the intersection of the
36 first and second planes.

1 3. (Previously Presented) The radiator element of Claim 2 wherein:

2 the feed lines are provided as microstrip transmission lines; and

3 each of the notch radiator elements are provided as fin-shaped substrates

4 coupled to the pyramidal structure of said balanced symmetrical feed.

4. (Cancelled)

5. (Cancelled)

1 6. (Currently Amended) The radiator element of Claim ~~21~~ wherein the notch radiator

2 elements are each provided from an electrically conductive material.

1 7. (Previously Presented) The radiator element of Claim 6 wherein the notch radiator
2 elements are each provided from a fin-shaped conductive substrate.

1 8. (Currently Amended) The radiator element of Claim 24 wherein the notch radiator
2 elements are each provided from a fin-shaped dielectric substrate having a conductive
3 material disposed thereover.

1 9. (Currently Amended) The radiator element of Claim 24 wherein each of the
2 substrates has a height of less than approximately $0.25\lambda_L$, where λ_L corresponds to a
3 wavelength of a low end of a range of operating wavelengths.

10. (Cancelled)

1 11. (Cancelled)

1 12. (Currently Amended) The radiator element of Claim 24 wherein the balanced
2 symmetrical feed further comprises:
3 a plurality of sidewalls, each of the sidewalls having first and second opposing
4 surfaces, a top edge and a bottom edge, said sidewalls arranged to form a cavity having
5 an open end; and
6 wherein each of the feed lines from the first and second pair of RF feed lines are
7 disposed on one sidewall surface and are electromagnetically coupled to a
8 corresponding one of the notch radiator elements.

1 13. (Currently Amended) The radiator element of Claim 12 wherein each of the RF
2 feed lines has first end and a second end with the first end of each of the RF feed lines
3 being coupled to the notch radiator ~~elements and elements and~~ the radiator element
4 further comprises a balun having a plurality of ports, each of the output ports coupled to
5 a corresponding one of the second ends of the RF feed lines.

1 14. (Original) The radiator element of Claim 13 further comprising a pair of amplifiers
2 each coupled between a corresponding one of the balun output ports and the second
3 feed end of one of the RF feed lines.

1 15. (Previously Presented) A wideband antenna comprising:

2 a cavity plate having a first surface and a second opposing surface;

3 a first plurality of fins disposed on the first surface of the cavity plate spaced
4 apart from one another forming a first plurality of tapered slots having a feed surface,
5 said first plurality of fins disposed to receive radio frequency (RF) signals having a first
6 polarization;

7 a second plurality of fins disposed on the first surface of the cavity plate spaced
8 apart from one another forming a second plurality of tapered slots having a feed
9 surface, each of said second plurality of fins disposed to receive RF signals having a
10 second polarization, with the second polarization being substantially orthogonal to the
11 first polarization; and

12 a plurality of balanced symmetrical feed circuits disposed on the first surface of
13 said cavity plate, each of said plurality of balanced symmetrical feed circuits having two
14 opposing pairs of radio frequency (RF) feed lines with each RF feed line from the first
15 pair of RF feed lines electromagnetically coupled to the feed surface of a corresponding
16 one of a first pair of fins of the first plurality of fins and each RF feed line from the
17 second pair of RF feed lines coupled to the feed surface of respective one of a first pair
18 of fins of the second plurality of fins wherein the feed lines from the balanced
19 symmetrical feed circuits are coupled to the first and second plurality of fins such that
20 the first and second plurality of fins are provided having coincident phase centers.

1 16. (Original) The wideband antenna of Claim 15 wherein the cavity plate further
2 comprises a plurality of apertures; and

3 wherein each of the plurality of balanced symmetrical feed circuits is disposed in
4 a corresponding one of the plurality of apertures.

1 17. (Original) The wideband antenna of Claim 17 further comprising a connector plate
2 disposed adjacent the second surface of the cavity plate and having a plurality of
3 connections;

4 and wherein each of the plurality of balanced symmetrical feed circuits has a
5 plurality of feed connections each coupled to a corresponding one of the plurality of
6 connector plate connections.

1 18. (Original) The antenna of Claim 15 wherein each of the fins has a height of less
2 than about approximately $0.25\lambda_L$, where λ_L refers to the wavelength of the low end of a
3 range of operating wavelengths.

1 19. (Original) The antenna of Claim 15 wherein each of the plurality of balanced
2 symmetrical feed circuits is a raised feed circuit having a shape which conforms to the
3 feed surfaces of a corresponding one of the plurality of fins.

1 20. (Original) The antenna of Claim 15 further comprising a plurality of baluns each
2 coupled to a corresponding RF feed line.

1 21. (Original) The antenna of Claim 20 further comprising a plurality of RF connectors
2 each coupled to a corresponding one of the plurality of baluns.

22. (Cancelled)

23. (Cancelled)

24. (Cancelled)

1 25. (New) A radiator element comprising:

2 a first pair of notch radiator elements spaced apart from one another and
3 disposed in a first plane, each of said notch radiator elements having a feed surface and
4 being capable of operating over a fractional bandwidth of not less the 3:1;

5 a second pair of notch radiator elements spaced apart from one another and
6 disposed in a second plane which is substantially orthogonal to the first plane in which
7 the first pair of notch radiator elements is disposed, such that the first pair of notch
8 radiator elements are disposed to receive RF signals having a first polarization and the
9 second pair of notch radiator elements are disposed to receive RF signals having a
10 second polarization which is orthogonal to the first polarization, said first and second
11 pairs of notch radiator elements being symmetrically disposed about a centerline
12 defined by an intersection of the first and second planes and each of said notch radiator
13 elements having a feed surface and being capable of operating over a fractional
14 bandwidth of not less the 3:1; and

15 a raised balanced symmetrical feed including:

16 a first pair of radio frequency (RF) feed lines, each of the RF feed
17 lines disposed symmetrically about the centerline and each of the RF feed
18 lines coupled to a feed surface of the first pair of notch radiator elements;

19 a second pair of RF feed lines, each of the RF feed lines disposed
20 symmetrically about the centerline and each of the RF feed lines coupled
21 to a feed surface of the second pair of notch radiator elements wherein
22 with the first and second pairs of RF feed lines are coupled to the first and
23 second pairs of notch radiator elements such that the first and second
24 pairs of notch radiator elements are provided having coincident phase
25 centers adjacent the transition sections;

26 a housing having four sidewalls with each sidewall having an upper
27 edge surface and a lower edge surface, the housing having a central

28 longitudinal axis which is aligned with the centerline defined by the
29 intersection of the first and second planes; and
30 a raised structure projecting from the upper edge surface of said
31 sidewalls, said raised structure having a substantially pyramidal shape
32 with each of the feed lines in the first and second pairs of feed lines
33 disposed on one of the four sidewalls and on one of the four sides of the
34 pyramidal-shaped structure wherein each of the feed lines have an end
35 which terminates at a point on the pyramidal-shaped structure which is
36 substantially aligned with the centerline defined by the intersection of the
37 first and second planes.

1 26. (New) The radiator element of claim 25 wherein:
2 the feed lines are provided as microstrip transmission lines; and
3 each of the notch radiator elements are provided as fin-shaped substrates
4 coupled to the pyramidal structure of said balanced symmetrical feed.

1 27. (New) The radiator element of claim 25 wherein the notch radiator elements are
2 each provided from an electrically conductive material.

1 28. (New) The radiator element of claim 25 wherein the notch radiator elements are
2 each provided from a fin-shaped conductive substrate.

1 29. (New) The radiator element of claim 25 wherein the notch radiator elements are
2 each provided from a fin-shaped dielectric substrate having a conductive material
3 disposed thereover.

1 30. (New) The radiator element of claim 25 wherein each of the substrates has a
2 height of less than approximately $0.25\lambda_L$, where λ_L corresponds to a wavelength of a
3 low end of a range of operating wavelengths.

1 31. (New) The radiator element of claim 25 wherein:

2 said sidewalls of the balanced symmetrical feed are arranged to form a cavity
3 having an open end; and

4 each of the feed lines from the first and second pair of RF feed lines are
5 disposed on one sidewall surface and are electromagnetically coupled to a
6 corresponding one of the notch radiator elements.

1 32. (New) The radiator element of claim 31 wherein each of the RF feed lines has first
2 end and a second end with the first end of each of the RF feed lines being coupled to
3 the notch radiator elements and the radiator element further comprises a balun having a
4 plurality of ports, each of the output ports coupled to a corresponding one of the second
5 ends of the RF feed lines.

33. (New) The radiator element of Claim 32 further comprising a pair of amplifiers each
coupled between a corresponding one of the balun output ports and the second feed
end of one of the RF feed lines.

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